CAMBRIDGE SYSTEMATICS

Bay Area/California High-Speed Rail Ridership and Revenue Forecasting Study

Findings from First Peer Review Panel Meeting

final

report

prepared for

Metropolitan Transportation Commission

prepared by

Cambridge Systematics, Inc.

with

Corey, Canapary & Galanis
Mark Bradley Research & Consulting
HLB Decision Economics, Inc.
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Citilabs

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draft report

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1.0 Introduction

The primary objectives of the Bay Area/California High-Speed Rail Ridership and Revenue Forecasting Study (HSR Study) are to provide information for the development of the Bay Area Regional Rail Plan, and to provide information to update environmental analyses to be conducted by the California High-Speed Rail Authority (CHSRA). More specifically, the HSR Study will develop a new statewide travel demand model system designed expressly for the purpose of evaluating a proposed high-speed rail (HSR) system connecting major metropolitan areas between Southern and Northern California. The new model system will also be used to evaluate different HSR alignment options between the Central Valley and the Bay Area.

The Metropolitan Transportation Commission (MTC), together with the CHSRA, selected a consultant team led by Cambridge Systematics (CS) to create the travel demand model system, and to evaluate a series of alternative high-speed rail alignment scenarios. Part of the contract included holding a series of three peer review panel meetings to evaluate all major aspects of model development and application. The peer review panel enhances the credibility of the process by providing an objective and independent review of the models, assumptions, methodologies, and results.

The purpose of the first peer review panel meeting was to provide technical guidance in the proposed model design, survey data collection plan, and proposed performance measures. Subsequent meetings will evaluate the survey data collection results, model specification, model estimation, model calibration, model system performance, and general compatibility with investment grade criteria requirements.

CS worked with MTC and CHSRA to identify peer review panel members that included several members from the private sector, interested public agencies, and academics. The final list of members is:

- Ayalew Adamu (California Department of Transportation (Caltrans) Headquarters);
- Jean-Pierre Arduin (independent consultant);
- Mike Bitner (Fresno Council of Governments (COG));
- Tim Byrne (Orange County Transportation Authority);
- Chris Brittle (independent consultant representing MTC);
- Billy Charlton (San Francisco County Transportation Authority (SFCTA));
- Gordon Garry (Sacramento Area Association of Governments);
- Kostas Goulias (University of California at Santa Barbara);

- Keith Killough (Southern California Association of Governments (SCAG));
- Frank Koppelman (Northwestern University);
- Brad McAllester (Los Angeles County Metropolitan Transportation Authority (Metro));
- Bill McFarlane (San Diego Association of Governments (SANDAG));
- Kazem Oryani (URS Corporation); and
- David Valenstein (Federal Railroad Authority (FAA)).

In addition, a number of observers were invited to the peer review panel meetings, including the following:

- Laura Biery (City of Palmdale);
- Jay Kim (Los Angeles Department of Transportation);
- Malcolm Quint (Bay Area Rapid Transit District (BART));
- Carl Schiermeyer (Riverside County Transportation Commission); and
- Beth Thomas (Caltrain).

CS hosted the first peer review panel meeting on June 8, 2005 in Oakland, California. Two additional meetings are scheduled to be held in late 2005, and in the spring 2006.

The body of this report is organized into four sections based on the agenda of the first peer review meeting. These sections are:

- Section 2.0 – Study Work Plan;
- Section 3.0 – Model Design;
- Section 4.0 – Survey Data Collection; and
- Section 5.0 – Performance Measures.

Each section begins with a summary of the scope of work and the CS team's proposed approach. Peer review panel comments are summarized, along with responses. Finally, an action plan is provided to outline how the proposed work plan has been changed from the input of the peer review panel members, as well as descriptions of upcoming activities.

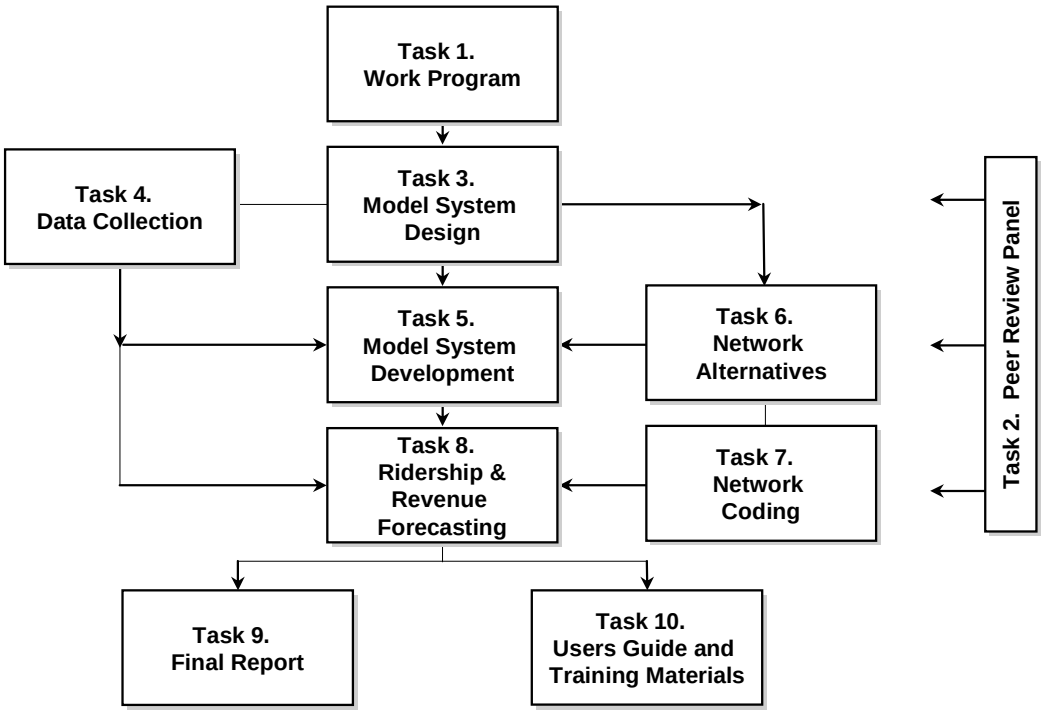
2.0 Study Work Plan

The first item for discussion was the work plan. The work plan presentation provided an overview to the peer review panel members of the entire scope of work, with an outline of specific goals and objectives for each task, as well as providing summary descriptions of CS' proposal to complete each task.

2.1 KEY FEATURES OF THE WORK PLAN

The work plan identified 10 main tasks, including a number of significant sub-tasks. The approach by task is presented in Figure 2.1. Highlighted tasks were discussed at the first peer review meeting.

Figure 2.1 Approach by Task



The significant subtasks are as follows:

- Task 3. Model system design:
  - Overview of the integrated modeling system;
  - Travel market definitions;
  - Mode choice model development;

  - Induced intercity demand; and
  - Model validation testing.
- Task 4. Data collection and database development:
  - Sampling Plan/Survey Pre-Test;
  - Survey Results;
  - Survey Geocoding;
  - Socioeconomic data;
  - Transportation supply data; and
  - Base year travel patterns.
- Task 5. Model system development:
  - Intercity mode choice model development;
  - Access/egress mode choice model; and
  - Model validation.
- Task 6. Design of network alternatives:
  - Route alignment;
  - Travel speeds, times, and distances;
  - Station locations;
  - Station access and intermodal linkages;
  - Competing modes;
  - Detailed station-station fares; and
  - Annualization factors.
- Task 7. Network coding:
  - Master highway and transit network;
  - Voyager's Public Transport module; and
  - Quality control review results.
- Task 8. Ridership and revenue forecasts:
  - Performance measure definitions;
  - Future baseline models;
  - Alternative model runs;
  - Performance measures; and
  - Ridership and revenue summaries.

2.2 PEER REVIEW PANEL COMMENTS AND RESPONSES

Comments were received on a number of topics, including induced economic growth, and whether land use data would be used. These and other panel member comments are more logically suited to the forthcoming sections on model design, data collection, and performance measurements during this discussion. Those comments have been moved accordingly for the purposes of overall readability.

3.0 Model Design

The CS team developed a proposed technical design and model system specification to be used as a blueprint for subsequent data collection, data collation, model estimation, model calibration, model validation, and travel forecasting. The model system design also includes network development and travel analysis zone development processes.

The basic approach to model design has been to develop two integrated model systems: 1) travel demand models from the major urban areas would be combined, and 2) new intercity travel models would be developed. These model systems would be integrated into a single combined model system.

3.1 OVERVIEW

Model Components

The study team presented the proposed model development plan topics:

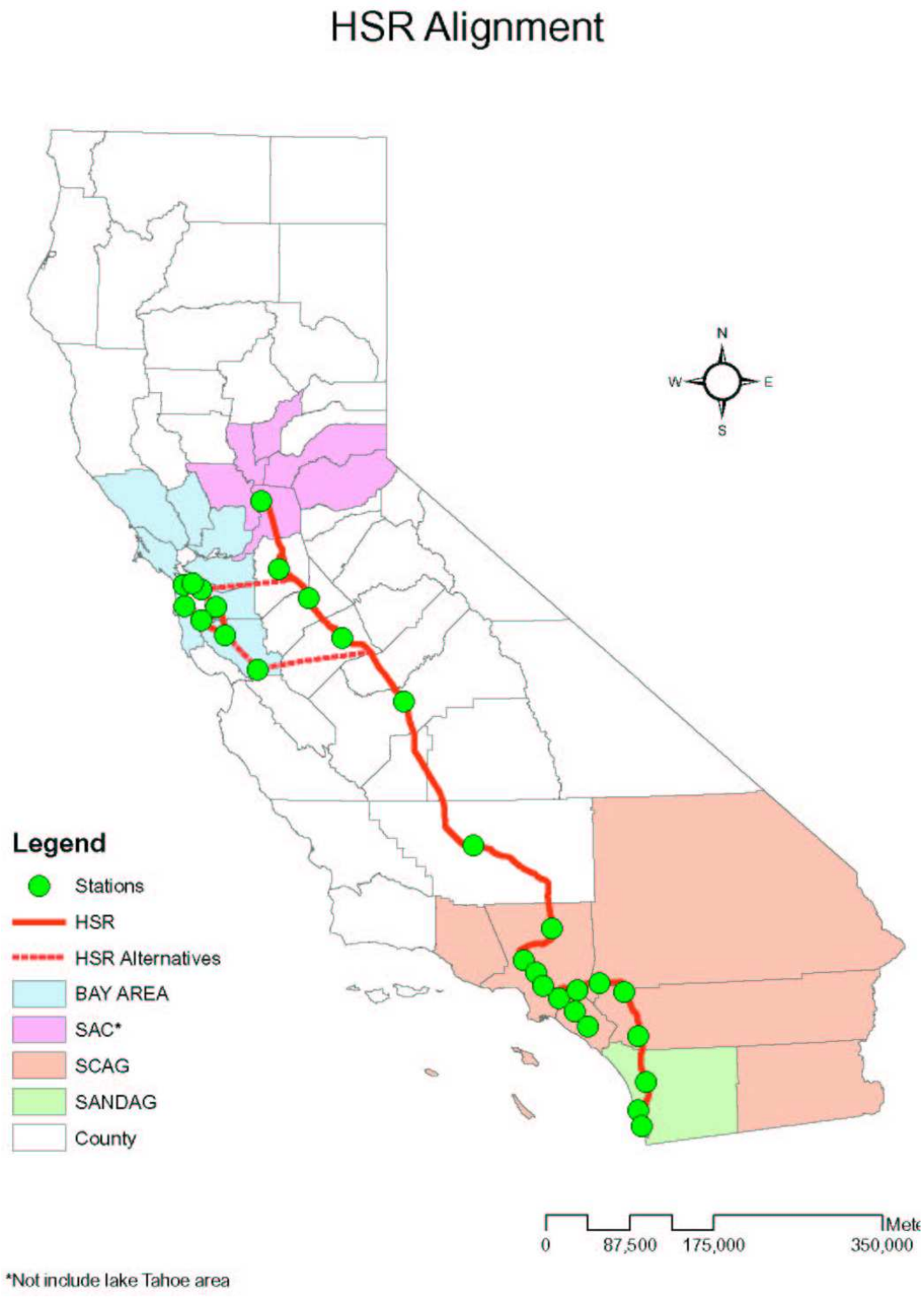
- Urban travel;
- Intercity travel;
- External travel;
- Trip assignment; and
- Model validation and application.

Urban trips include all trips with both ends in one of the three urban areas with more than one proposed high-speed rail station. These areas are the San Francisco Bay Area, Greater Los Angeles, and San Diego regions. Sacramento has also been considered, since a second station in the Sacramento region is being considered. The metropolitan planning organizations (MPO) representing these areas are the MTC, SANDAG, SCAG, and the Sacramento Area Council of Governments (SACOG). These urban areas are presented in Figure 3.1.

Intercity trips include all trips with both ends in California and whose origin and destination are in different urban areas having proposed high-speed rail stations.

External trips include trips with one end outside California and one end in an urban area with a proposed high-speed rail station.

Figure 3.1 California Urban Areas and HSR Station Locations



Some urban trips may be longer than some intercity trips by this definition and vice-versa. These definitions do clearly fit in with urban and statewide planning definitions, and also identify most intercity trips as those that begin or end outside an urban area.

However, there are also cases where trips of roughly equal lengths and with similar characteristics can be classified differently. One example of this anomaly is a trip from Modesto to San Jose (defined as an intercity trip), as opposed to a trip from Palmdale to Los Angeles (defined as an urban trip). Even taking these anomalies into consideration, there was consensus of the study team that the definition of urban and intercity trips fit well with the majority of trips in the system, and that the models proposed for each would adequately address the behavioral nature of each trip type.

Trip assignment includes the merging of the urban, intercity, and external trips into a modal trip tables that are assigned to highway, rail, and air networks. These assignments will be validated in the base year and forecast year to evaluate reasonableness and accuracy compared to observed data sources. The base year will be 2005, but a year 2000 model run to compare with data sources that are from this year will also be prepared. In addition, sensitivity tests will be performed to ensure that the models capture behavioral changes to key parameters, such as time and cost.

Temporal Coverage

The California intercity models will explicitly model peak and off-peak travel for both urban and intercity trip movements. Consistent with most urban and statewide models, this model will estimate average weekday riders for the high-speed rail system. These average weekday riders will be converted to average annual riders using annualization factors developed from available high-speed rail systems around the world. If data is available to develop annualization factors by trip purpose, these will be used.

Trip Purposes

The study team presented the proposed set of trip purposes to be used for the intercity and urban models in Table 3.1. Business and commute trip purposes will be derived separately based on the regular work location, rather than having respondents interpret which trips are business and commute trips to provide consistency in this purpose.

Table 3.1 Proposed Trip Purposes

Urban Models	Intercity Models
Home-based work	Business
Home-based school (grades K-12)	Commute
Home-based college	Vacation/recreation
Home-based other	Other
Non-home-based	

Modes

The study team presented the proposed set of modes to be used for the intercity and urban models in Table 3.2. Intercity bus is not being considered as a separate mode for intercity models, because this mode is quite small in California, is not directly competitive with high-speed rail, and serves a different market.

Table 3.2 Proposed Modes

Urban Models	Intercity Models
Drive alone	Auto
Two (2)-person shared ride	Air
Three or more (3+)-person shared ride	Conventional rail-auto access
Transit-auto access	Conventional rail-walk access
Transit-walk access	High-speed rail-auto access
High-speed rail-auto access	High-speed rail-walk access
High-speed rail-walk access	

Data Sources

Data sources for developing models will be derived from a variety of existing and new data sources. These data sources are outlined in Table 3.3.

Table 3.3 Expected Modeling Data Sources

	Intercity Travel	Urban Travel
Trip Table Model Estimation	• California Statewide Household Survey (1999)	• Regional models
Trip Table Model Validation	• Traffic count data • Ridership data • New household survey data • CHSRA household and intercept surveys (1995) • Select origin-destination surveys	• Regional models
Mode Choice Model Estimation	• New traveler intercept survey data • New household survey data	• Regional models • SCAG high-speed rail stated-preference survey data (2000)
Mode Choice Model Validation	• National Highway Travel Survey (2001) • Census Transportation Planning Package (2000) • Traffic count data • Ridership data	• Urban household survey data summaries • Census Transportation Planning Package (2000) • Traffic count data • Ridership data
Trip Assignment	• Traffic count data • Ridership data	• Traffic count data • Ridership data

Urban and Intercity Modeling Approaches

There were four modeling approaches presented for urban and intercity models. Table 3.3 presents the urban and intercity modeling options. While these options are similar for the urban and intercity models, the recommendations for each modeling approach are quite different based on the different objectives for each model.

Table 3.4 Urban and Intercity Modeling Options

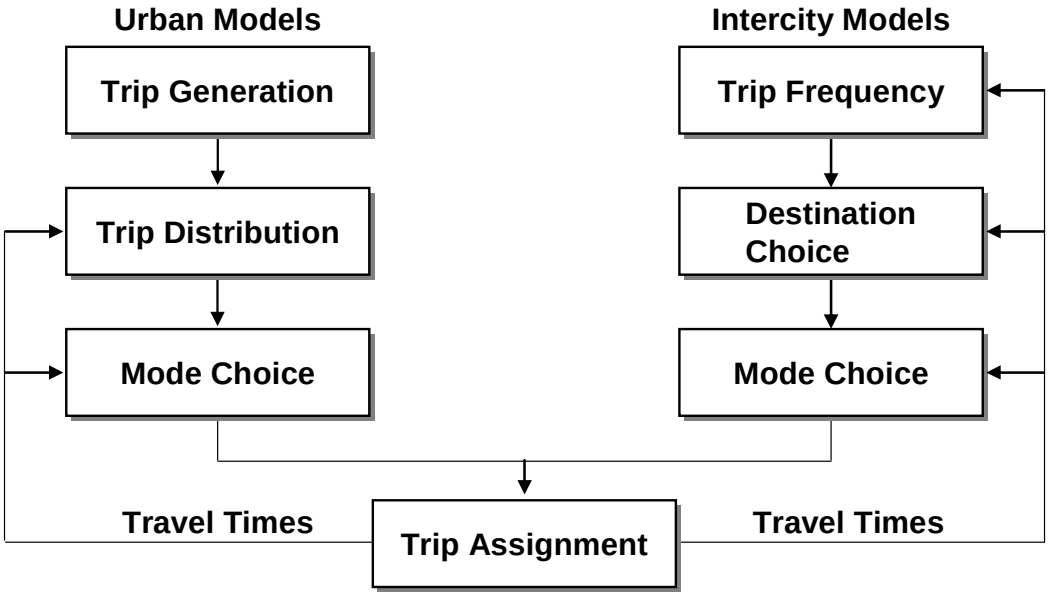
	Trip Generation	Trip Distribution	Mode Choice
Option 1	New	New	New
Option 2	Existing	New	New
Option 3	Existing	Existing	New
Option 4	Existing	Existing	Existing

Option 3 was recommended for use in urban model development, and Option 1 was recommended for use in intercity model development.

Trip Assignment

The trip assignment models will bring together the urban and intercity model trips and assign these to modal statewide model networks (auto, air, and rail). There will be feedback of congested auto travel times to represent the effects of congestion on travel time. Figure 3.2 presents the travel time feedback for urban and intercity models.

Figure 3.2 Travel Time Feedback



3.2 PEER REVIEW PANEL COMMENTS AND RESPONSES

Urban Area Definitions

A question was asked how the urban area definitions were arrived at. Urban areas defined as those areas having more than one station – except Sacramento.

The Sacramento region was included, however, because it is the fourth largest metropolitan area in California.

The Los Angeles (SCAG) region is quite large and extends from Los Angeles to the Nevada border, but does not include Las Vegas. Even though high-speed rail may be considered in the Las Vegas to Los Angeles corridor, it is not considered to be part of this study.

In addition, Metrolink is contained within the SCAG region. There was some discussion regarding whether this should be considered for intercity travel, but the panel agreed that the current definition for urban and intercity travel was preferred.

It was also confirmed that the study team will treat Temecula and Palmdale as separate places within the SCAG region. These are important high-speed rail stations, and the stations are 50 to 60 miles apart. A significant amount of growth is occurring here, with many commuters to Los Angeles. Forecasts show a large job-housing imbalance in that area. These areas will be considered within the SCAG region, but induced growth for these areas will be estimated separately, as described in the model design plan.

The San Diego (SANDAG) region extends to the Mexico border, but does not include Tijuana. Tijuana is considered as a special case and is being included in the modeling as an external zone.

Model Validation Data Sources

A question arose regarding the different modeling validation data sources – apart from model estimation sources. The California travel survey is proposed for use in intercity trip table estimation. Mode choice models will be estimated using new intercept and household surveys.

Other sources of data are available for model validation. It was noted that the team should evaluate each of these data sets and assign a priority for use in validation. Some data sources might be contradictory.

A discussion also ensued regarding various data sources and their relative importance for model validation. The 10-year old, high-speed rail survey is a low priority for validation purposes, other than for trip generation and distribution. It was agreed that there is some value in comparing old and new data, but it was also acknowledged that it will be difficult to validate auto trips. Traffic counts and ridership data should be at the top of the hierarchy for validation sources. Table 3.2 presented the various validation data sources.

Urban Modeling Options

It was clarified that the study team will plan to use existing trip distribution tables. We do not intend to redevelop trip generation and distribution models for each of the urban areas.

One panel member expressed that using the same generic mode choice models for the urban models was not necessarily a good idea. The rationale for the generic model was to have a consistent model (same value of time, same in-vehicle travel time coefficients, etc.) in order to establish that decision-making is similar across the urban areas. In addition, given that SCAG will be the only region to have included a high-speed rail mode, it seemed appropriate to have a generic model across the State.

Discussion then ensued regarding differences in behavior between regions. It was commented that the generic model approach would suppress regional differences. It was suggested that these might not be differences in behavior, but differences in the way these models were historically specified in each area. A generic model would level the playing field.

One member wanted to find out what other countries were modeling high-speed rail. The introduction of high-speed rail to Paris, Lyon, Marseilles, Lille, etc. did not change urban area travel at all. High-speed rail had virtually no impact on urban travel due to station distances and the need to pre-purchase boarding passes. However, HSR did have a large impact on interregional travel in France. Adding HSR stations changed trip distribution and created new economic development; this has been a long-term effect. In fact, there is a 15-minute minimum ride in France, so short-distance travel is not allowed.

Another respondent noted that the change in local- and long-distance travel patterns varies by nation. Japan, for example, has more urban travelers. In California, it was noted that there is a need to serve both long-distance and urban travelers, and to also serve commuter markets. One of the main outcomes of this study will be to evaluate changes in travel patterns for each of these types of travelers.

One member asked if the high-speed rail mode could be used in each urban area, while still retaining each region's mode choice models. There was also discussion on how different commuter rail is from high-speed rail. Another member noted that a consistent model system is needed to test alternatives. Urban models are proposed to be split from the intercity models, because there is more detail in each of the urban models. It was suggested that the team might want us to use the existing models and introduce a HSR mode. However, another person noted if the behavior is different in each area, then we are better off using different models. For example, residential and employment density in each of the urban areas is different. We agreed to consider both Options 3 and 4 and review the individual mode choice models in each region to determine if the individual mode choice models can be retained (at least the underlying behavioral differences in these models).

One commenter stated that drive-alone and shared-ride modes should not be combined. The rest of the panel agreed with this approach.

High-Speed Versus Conventional Rail

One member suggested that the intercity rail was not very different than conventional rail, and that high-speed rail should be modeled as a kind of conventional rail. However another participant noted that high-speed rail is a very fast and premium mode. There was also concern about the need to be careful with levels of service (LOS). One possibility would be to separate rail skims by income group. We propose to model high-speed rail as a separate mode from commuter rail, as presented in our model design.

It was noted that for European high-speed rail systems, travelers typically travel for greater than 15 minutes. It was agreed that CS should test a travel time parameter in the skimming process. However, it was pointed out that European high-speed rail systems are exclusively serve inter-regional markets, whereas the California system may serve both inter-regional and urban market. The study team suggested that the travel time measure in skims be tested, and a recommendation will be presented at a future peer review meeting.

High-Speed Rail Modes of Access and Egress

Questions were raised about the model systems transit access and egress modes. The response was that walk/transit and drive access models will be included. The transit transfer access will be allowed for all transit modes. In France, only five percent of the ridership are from walk access, and they model walk and transit access models as a single non-auto mode of access.

Questions were also asked about the zone system, and whether there would be enough zones to represent all the detailed services. The current plan is to use the MTC zone system in its entirety (1,454 zones); the statewide model zone system outside of the Bay Area (more than 2,500 zones statewide); and more detailed zones near the proposed high-speed rail stations to better represent walk versus drive access.

Induced Travel

There are two separate kinds of induced travel: 1) travel from economic growth and 2) induced trip-making. Induced travel from economic growth will be estimated as part of the intercity modeling process, but outside the urban modeling process. This is important for Temecula and Palmdale, and it will be factored into the trip tables to see the impact on ridership. In previous work for CHSRA, CS had used a land use economic model to look at detailed land uses, shift shares, how many businesses would relocate, and changes in productivity. A REMI model was used to do those analyses. CS also reviewed both redistributed growth and new growth. A description of this approach is provided in the *Economic Growth Effects of the System Alternatives for the Program Environmental Impact Report/Environmental Impact Statement Report* (Cambridge Systematics, 2004). The panel agreed that a simple approach would be adequate.

Induced trip-making will be estimated within the intercity modeling process and is not relevant to the urban modeling process. In France, induced travel happened more often in smaller cities. In large urban areas, like Paris, it did not result in additional travel, because people traveled everywhere even in the base year. Smaller places that did not have as many transit options before will travel more after introduction of a high-speed rail station.

Intercity Modeling Options

We propose to create new logit-based models for trip frequency, destination choice, and mode choice. These models are based on the need for different trip purposes than exist in current models, and to provide a means to estimate induced travel directly.

There was some difference of opinion on the sufficiency of the California Travel Survey for use in developing trip frequency and destination choice models. One member noted that the entire sample should be used, not just in the corridor. Another member suggested that the sample size of approximately 3,300 was adequate for trip frequency models. One member argued that this proposal was inadequate as the map of surveyed home destinations showed results that did not appear to support this concept.

In addition, the model validation data sources will provide assurance that the models estimated from these smaller samples are reasonable. One member suggested that urban household surveys could be used to expand the California Travel Survey with intercity trips captured in these local surveys. Unfortunately, these are not geocoded at a statewide level, but city names might be used for this. It was agreed to review and include these data, where possible. The National Highway Travel Survey was reviewed as a potential dataset for estimating intercity trips, but there was not enough geographic reference to use these data.

One member mentioned that it might be better to do a simultaneous model, rather than separate sequential models. This would be a joint trip frequency, destination choice, and mode choice model. There was some discussion that this might be ideal, but not as practical as the sequential models for our purposes.

Revenues

There was a discussion on ridership versus revenue maximization. The CHSRA desires to optimize the system to maximize benefits, which will include both ridership and revenues. There is an objective for intercity trips to cover their operating costs, but urban trips may not.

Trip Assignment

A panel member suggested that the proposed feedback of travel times in assignment to other model components looks good in theory, but it may not be stable. Using accepted methods of averaging to improve the likelihood of convergence in this feedback is proposed.

Another member asked if the study team had thought of using accessibility within certain miles, etc. in the trip frequency model. This will be considered and tested during model development.

There was a question regarding whether the validation year should be for 2000 or 2005. This is a concern, because of all the information available from different years, the panel suggested that the models for year 2000 be validated, and then validation for year 2005 be updated. Changes in travel between 2000 and 2005 may help to determine the reasonableness of the model results. Datasets specific to each year should be used for each validation rather than trying to adapt each dataset to fit. One complicating factor is that in the year 2000, the Bay Area had a 10-percent job loss, which makes it difficult to use these data. Airline passengers will be validated using origin-destination routes coming from the FAA 10-percent sample.

4.0 Survey Data Collection

4.1 OVERVIEW

Types of Surveys

The development and application of the high-speed rail forecasting model will require the collection of several types of data:

- Airline Passenger Intercept Survey;
- Rail Passenger Intercept Survey; and
- Household Auto Traveler Survey.

Data is required to support intercity mode choice model estimation and validation of intercity trip frequency and destination choice models. Data will be collected on weekdays.

Sample Size

Proposed sample sizes for each type of survey are presented in Table 4.1. The airline and rail surveys will be conducted in specific origin-destination markets, as follows:

- Sacramento;
- San Francisco Bay Area;
- Stockton;
- Modesto;
- Merced;
- Gold Country;
- Fresno;
- Monterey Bay Area;
- Visalia;
- Bakersfield;
- Los Angeles; and
- San Diego.

The household surveys will be conducted for households within these same areas, and trips will be screened within these destination markets.

Table 4.1 Proposed Sample Sizes

Survey Type	Completed Surveys	Recruited Surveys
Airline Passenger Intercept	600	900
Rail Passenger Intercept	450	600
Household Auto Traveler	600	720
Total	**1,650**	**2,220**

Survey Protocol

Two survey protocols were tested in the pre-test: 1) a mail-out/call-back protocol and 2) an on-site protocol. The response rates for the on-site (58 percent) were significantly better than the mail-out/call-back protocol (18 percent), so the study team recommended that this protocol be used.

4.2 PEER REVIEW PANEL COMMENTS AND RESPONSES

Weekend Travel

There is a significant amount of long-distance travel that occurs on weekends in the State of California, and collecting data only on weekdays is proposed. This is primarily due to the fact that there are no available resources to collect data or estimate models for weekends, and the fact that the existing urban models do not represent weekends. The study team proposed to estimate weekend ridership as a factor of weekday ridership, based on observed data from other high-speed rail routes around the world.

There was discussion on the calculation of annualization factors. There was concern raised about distorting weekend purpose and distribution by using annualization factors. In addition, from an operational standpoint, there are different schedules for weekdays and weekends. Nonetheless, the panel agreed that the approach to using observed data from existing HSR systems to estimate annualization factors was reasonable, given limited resources for data collection.

Airline Passenger Survey

There was a question regarding why the study team proposed to survey only one Southern California airport. After reviewing the current air origin-destination markets in Southern California, it was determined that since collection of data in these air markets is by asking questions on both origin and destination, the other Southern California airports will be covered.

Rail Passenger Survey

One reviewer asked if Metrolink would be included along with Amtrak in the rail passenger survey. The study team is planning to survey Metrolink between Anaheim and Oceanside, as that is an intercity trip.

Household Auto Travel Survey

It was pointed out that since there is more travel in summer, it has to be factored into the survey. A study team member noted that the surveys would be based on travel made over the past six months, so the specific times when surveys would be collected were relatively unimportant.

Sample Size

The proposed air passenger sample size was 600 completed surveys. Given a 30 percent fall-off, there is a need to have 900 recruits. It was asked if the samples are similar for each Airport. That issue is still under consideration.

Several panel members expressed concern about the plan to collect 1,600 total samples. The study team said that the sample size was really 6,400 (1,600 x 4 four choice experiments per respondent). However, a panel member noted that there were still only 1,600 persons and their multiple answers may have strong correlations. There was considerable discussion regarding what would constitute a reasonable sample size. One member said that even traditional mode choice models have fewer persons than what is desired by the model developers. CHRSA reported that in 2020, there would be between 42 million to 68 million riders per year, or 160,000 to 200,000 riders per day. To collect a one-percent sample, you would need 2,000 persons. The collective judgment from the panel members felt that a minimum total of 2,500 persons would represent a reasonable sample size. The study team will review the allocation of resources to increase the overall sample size to 2,500; and since there was greater concern over the sample size for the household survey, all of the additional samples will be collected in the household survey, for a total sample size of 1,450 household surveys.

Other panel members expressed views that the sample size proposal was too low for smaller origin-destination pairs, but sample size may be sufficient for more important markets. However, another participant warned that some small markets may be important for high-speed rail ridership, and they should not be overlooked. Since this data collection is being used primarily for mode choice modeling and not destination choice modeling, this issue of capturing all origin-destination markets is not a concern. However, at least one member disagreed with this conclusion.

Survey Questionnaire

There were a number of specific comments regarding the proposed survey questionnaire:

- For Questions 18 and 19, a recommendation was made to remove the title "Access/Egress" so as to be less intimidating for survey respondents.
- Questions were raised about the need to ask about frequent flyer traveler club. It was suggested to remove this question.
- The panel agreed that a parking cost question should be added.
- Suggestions were made to change Questions 19 and 19a wording to be clearer. Both the questions sound similar.
- One member pointed out, and others agreed, that there were many superlatives in the description of HSR and might bias the respondent. Also speed might frighten people, time is better to show. The consensus was to remove speed.
- Regarding choice Exercise A, conventional rail is not currently a realistic option today between Northern and Southern California. It was suggested to check the schedules for the San Joaquin and Coast lines.
- High-speed rail schedules usually have relatively infrequent headways. Reality might be one every hour. However, it was pointed out that the Japanese high-speed rail system has headways as low as every four minutes.
- Should high-speed rail have lower fares than air? It might be more.
- One member suggested that we generalize the verbiage and make the sheet easier to use.
- Another member wanted simple, quick, to-the-point surveys. The participant also said that there should be at least a 30-minute difference in times and a 20-percent (or more) difference in cost, etc.
- Another suggestion was to reword the fare as per person.
- Another member said that there is no information on amenities (comfort, reliability, etc). The surveys should include these data.

The study team will be revising the survey questionnaire based on these and other internal study team comments, and will resubmit the questionnaire to the peer review panel for review.

5.0 Performance Measures

5.1 OVERVIEW

There are four key audiences for the performance measures (technical staff, public sector decision-makers, private sector, and the general public); and the measures chosen may vary for each audience. The measures will be developed in five categories, as follows:

1. Trips and station activity usage;
2. Travel time and congestion of intercity and urban travel, as well as station area activity;
3. Financial – direct and indirect revenue generation;
4. Externality – air quality; and
5. Key input data.

5.2 PEER REVIEW PANEL COMMENTS AND RESPONSES

Long-Range Forecasts

Questions were asked about 2040 and 2050, and forecasts were going to be developed. Options and issues are as follows:

- One option was to use 2030 data, and create growth factors for the long-term horizon.
- Another option would use county-level control total data for 2040 and 2050 from two state agencies that forecast population and employment, and then develop a method to allocate these data to the zone level. One member suggested not using county-level data, because these sources were not balanced.
- A panel member questioned the validity of developing 2040 and 2050 forecasts when the opening year is 2016, and these resources could be better spent on alternatives analyses or back-casting.

One panel member suggested that some or all of the forecasts should include conducting forecasts using low, medium, and high ranges of growth.

The study team agreed to reconsider the allocation of resources to specific forecasting activities and noted that the forecasting procedures will be the topic of a future peer review panel meeting.

Externalities as Performance Measures

Suggestions were made to add accidents, safety, ozone by air basins, as well as CO, NO_x, etc. to the list of externality measures. There values could be generated by examining the differences between alternatives, not the actual numbers. It was further suggested that we use the CARB model for air quality. Inputs required are vehicle miles of travel by speed distribution.

Fact Sheets and Other Measures

There was general consensus that the fact sheets were a good means to disseminate technical information quickly. One member suggested removing 2005 from the ridership forecast fact sheets. It might be confusing.

One reviewer suggested reducing the number of overall measures, and conducting a more comprehensive development of each measure to better utilize resources. The study team will review current proposed performance measures and provide a more limited set for review by the peer review panel.

The panel members were not interested in doing a SUMMIT analysis, because of the current limitations in SUMMIT. This is primarily the fact that SUMMIT does not provide benefits for highway users.

6.0 Summary

Next Steps

The next meeting is proposed for November 4, 2005, and will include a review of the model development and network alternatives tasks. In addition, the panel suggested that the study team has focused working groups to concentrate on different tasks. The proposed working groups will be provided additional information, and will provide comments to the study team by e-mail or conference call. The proposed working groups are as follows:

- Surveys:
  - Frank Koppelman;
  - Kostas Goulias;
  - Chuck Purvis;
  - Chris Brittle; and
  - Dan Leavitt.
- Urban Models:
  - Bill McFarland;
  - Gordon Garry;
  - Keith Killough; and
  - Chuck Purvis.
- Intercity Models:
  - Ayalew Adamu;
  - Billy Charlton;
  - Jean Pierre Arduin;
  - Kazem Oryani;
  - Dan Leavitt; and
  - David Valenstein,

The study team will provide documentation of this meeting. Panel members may also provide their own comments on specific tasks.

Action Items

There were many discussions of the proposed approach to model design and data collection and development of performance measures discussed during the course of the peer review panel meeting. In addition, there were a number of

suggestions from peer review panel members that resulted in a change in the proposed approach or an agreement that further information was warranted before proceeding. These are documented throughout this report, but are summarized here as action items that the study team will follow up on in the coming months:

- Urban mode choice models will be reviewed to consider using existing models adapted to include a high-speed rail mode, rather than developing a generic mode choice model for all urban areas in the State. Further evaluation and comparison of the urban mode choice models will help to make this determination.
- The panel suggested that the study team consider a minimum travel time parameter (like 15 minutes) for high-speed rail to preclude short trips on this mode. However, this parameter could cause unintended results when modeling urban high-speed rail trips and therefore must be carefully reviewed. This is a question for the network alternative task and will be considered during the second peer review panel meeting.
- Urban area household travel surveys will be reviewed to identify potential intercity trips that can be used to expand the California Household Travel Survey sample size. In addition, the household survey data collection may be used to supplement these surveys. To ensure that these data are sufficient for model development, validation from several data sources will be conducted on the trip frequency and destination choice models.
- The proposed model validation year is 2005, but since some significant data sources are from the year 2000, changes between these years will need to be studied and understood. The study team proposes to conduct separate validation tests for the year 2000 and 2005 data, rather than combining these datasets and tests.
- The study team will reallocate resources to increase the sample size of the new survey data collection to 2,500 samples for mode choice model development. The increase in survey sample size will be achieved by expanding the household auto travel survey to 1,450 surveys. Air surveys will continue to have a sample size of 600 and rail surveys will have 450 samples.
- Survey questionnaires will be revised and resubmitted to the peer review panel working group. In addition, the household pre-test will be delayed to test these changes in the field.
- The study team will reconsider allocation of resources to the 2040 and 2050 forecasts for the third peer review panel meeting.
- Performance measures will be reduced to provide a more limited set of robust measures for consideration. SUMMIT analyses will not be used to estimate performance measures due to its limitations.